

CLAIMS

What is claimed is:

1. A liquid-level sensor operable with a volume in which a liquid may be present to different heights above a bottom of the volume, the sensor comprising:

at least two solid optical conductors, each solid optical conductor including an outer surface having at least one reflective surface discontinuity of sufficient size to interfere with a total internal reflection of the solid optical conductor when the reflective surface discontinuity does not contact the liquid;

a support that positions the reflective surface discontinuity of each of the at least two solid optical conductors at a location corresponding to a different height above the bottom of the volume;

a light source which introduces light into a first end of each of the solid optical conductors; and

a light detector structure which receives light that has been introduced into each of the solid optical conductors and has traveled through the respective solid optical conductor at least as far as at least one of the reflective surface discontinuities of the respective solid optical conductor.

2. The sensor of claim 1, wherein the light detector structure comprises a light diffuser having a visual indication of the liquid level.

3. The sensor of claim 1, wherein the light detector structure comprises a non-electrical structure.

4. The sensor of claim 1, wherein the light detector structure comprises an electrical device.

5. The sensor of claim 1, wherein each of the solid optical conductors is an optical fiber.

6. The sensor of claim 1, wherein the liquid is in a container.

7. The sensor of claim 1, wherein the light detector structure is at a second end of each of the solid optical conductors.

8. The sensor of claim 1, wherein the light detector structure is at the first end of the solid optical conductor, and a second end of the solid optical conductor is reflective of light.

9. The sensor of claim 1, wherein the at least one reflective surface discontinuity comprises a transverse surface notch.

10. The sensor of claim 1, wherein the at least one reflective surface discontinuity comprises a non internally reflective portion of the outer surface of at least one of the solid optical conductors.

11. The sensor of claim 1, wherein the at least one reflective surface discontinuity comprises a non internally reflective flat on the outer surface of at least one of the solid optical conductors.

12. The sensor of claim 1, wherein each of the solid optical conductors is an optical fiber having at least one of the reflective surface discontinuities spaced along a length of each of the optical fibers, and the light detector structure is at a second end of each of the optical fibers.

13. A liquid-level sensor operable with a volume in which a liquid may be present to different heights above a bottom of the volume, the sensor comprising:

5 at least two solid optical conductors, each solid optical conductor including an outer surface having at least one reflective surface discontinuity of sufficient size to interfere with a total internal reflection of the solid optical conductor when the reflective surface discontinuity does not contact the liquid;

10 a support that positions the reflective surface discontinuity of each of the
at least two solid optical conductors at a location corresponding to a different
height above the bottom of the volume;

a light source which introduces light into a first end of each of the solid
optical conductors; and

15 a light detector structure comprising a non-electrical light diffuser
positioned so that a second end of each of the solid optical conductors directs a
respective output beam onto a respective region of the light diffuser, each of the
respective regions having a visual indication thereon of being illuminated by its
respective output beam.

14. The sensor of claim 13, wherein each of the solid optical conductors
is an optical fiber.

15. The sensor of claim 13, wherein the liquid is in a container.

16. The sensor of claim 13, wherein the at least one reflective surface
discontinuity comprises a transverse surface notch.

17. The sensor of claim 13, wherein the at least one reflective surface
discontinuity comprises a non internally reflective portion of the outer surface of
at least one of the solid optical conductors.

18. The sensor of claim 13, wherein the at least one reflective surface
discontinuity comprises a non internally reflective flat on the outer surface of at
least one of the solid optical conductors.

19. The sensor of claim 13, wherein each of the solid optical conductors
is an optical fiber having at least one of the reflective surface discontinuities
spaced along a length of each of the optical fibers, and the light detector is at a
second end of each of the optical fibers.